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73



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/CONTENT/

/ Letters to the Editor /	197
/ Editorial /	
Luis A. Ordóñez: INTERCIENCIA, COMMUNICATION AND DEVELOPMENT	198
/ Articles /	
Johanna Döbereiner: NITROGEN FIXATION IN TROPICAL GRASSES	200
Erik Eckholm: FORESTRY FOR HUMAN NEEDS	207
Simon Schwartzman: SCIENCE, TECHNOLOGY, TECHNOCRACY AND DEMOCRACY	215
Philip M. Fearnside: CATTLE YIELD PREDICTION FOR THE TRANSAMAZON HIGHWAY OF BRAZIL	220
/ Science and Technology Today /	
Allen Jedlicka: APPROPRIATE TECHNOLOGY	227
Edmundo Flores: OPPORTUNITIES FOR THE SCIENTIFIC AND TECHNOLOGICAL COOPERATION BETWEEN MEXICO AND THE UNITED STATES	228
Guillermo Fernández de la Garza: THE ROLE OF TECHNOLOGICAL RESEARCH INSTITUTIONS IN COOPERATIVE RESEARCH	229
/ Internews /	232
/ Book Review /	
POST-HARVEST FOOD LOSSES IN DEVELOPING NATIONS - Reviewed by <i>Walter Jaffé Carbonell</i> IL RECERCATORE OGGI IN ITALIA - Reviewed by <i>G. B. Marini-Bettolo</i>	242
/ Publications Received /	243

COVER:

Sara Grilo, *Rojo Naranja* (Red Orange) 1960. Oil on canvass 130 x 130 cms. Collection, Museo de Bellas Artes, Caracas, through donation of the Society of "Friends of the Museo de Bellas Artes".

The Argentine painter Sara Grilo was born in Buenos Aires in 1920. She is self-taught and lived in Madrid and Paris between 1948 and 1950. In 1962 she received a John Guggenheim Memorial Foundation fellowship and travelled to the United States.

During the 'fifties Grilo worked in a constructivist vein, juxtaposing semi-abstract forms of different sizes and contrasting colors. During the 'sixties her style was influenced by Informalism. Her pictures of this period tend to be dominated by one color, as in *Rojo Naranja* (Red Orange). The content is mainly formal, and the theme could be said to be the relation of the two colors. (Photographic credit, Federico Fernández; Comments, Richard Soler. cover, courtesy, Museo de Bellas Artes, Caracas).

SCIENCE, TECHNOLOGY, TECHNOCRACY AND DEMOCRACY*

SIMON SCHWARTZMAN

SUMMARY The nineteen seventies have challenged once more the expectations that science and technology could by themselves provide the basis for the future well-being of mankind. The slowing down of the space program in the U.S., on one hand, and the limitations of the green revolution, on the other, are witnesses of that fact. Scepticism with hard technology leads to attempts to apply the scientific method to the management of social life, along two alternative approaches. The first is an attempt to rationalize society through the creation of a free market of rational people, having economics as its paradigmatic discipline. The second is an attempt to organize society according to well-defined blueprints—and sociology, as it was conceived by Auguste Comte, is the social science for that.

In both cases, politics was to be excluded as non-rational

elements that disturbed the free exercise of social rationality. The organizational model of the scientific community, when applied to the political system, leads to technocratic ideologies of social engineering. The paper intends to show, however, that there is no technological or technocratic escape for problems of social welfare and freedom. If it is illusory to believe that science and technology, by their growth, can redeem society, it is also illusory to believe that a reversal to small-scale technology could do it, because, when this is attempted, it is usually coupled with systems of large-scale social engineering and control. In the conclusion, the article maintains that the most important role the social sciences can perform is not to try to emulate the technocratic myths we inherited from the 19th century but to help to clarify the true place of science and technology in the modern social and political systems.

And, he gave it for his opinion; that whoever could make two ears of corn, or two blades of grass to grow upon a spot of ground where only one grew before would deserve better of mankind, and do more essential service to his country, than the whole race of politicians put together.

"A Voyage to Brobdingnag", *Gulliver's Travels*, by Jonathan Swift; used as an epigraph by Stanley Johnson in *The Green Revolution*, London, 1972.

One of the assumptions of the nineteenth century was that, with science, mankind could be freed from politics. Science was perceived as the reign of logic and reason, while politics was the reign of emotion and passion. Science was expected to achieve the Kingdom of Reason through different means. First, it would end poverty, and this was supposed to bring happiness and peace. Second, it would teach people how to think rationally, and this would lead to rational behavior in all spheres of activity. Third, social and political matters in themselves could be dealt with scientifically, and this would eliminate irrational

disputes and produce the best of societies.

However challenged by historical experiences and intellectual refutations, these assumptions have not faded away. They remain very much in force as myths and ideologies that justify the activities of scientists and of those that use science, or its cover for whatever goals they wish to pursue. With this view of science, politics is not suppressed in fact, but it tends to be denied as unworthy, irrational and undignified. It tends to be suppressed intellectually, and this is the way in which science and technology can become technocracy. We can understand this process better if we look a little closer at each of the means by which science was supposed to eliminate politics.

Limits to Science

One of the important realizations of the nineteen seventies is that science growth and technological development is not an endless frontier, but is approaching some limits that are already visible. These limits are being placed by the foreseeable exhaustion of natural resources and new frontiers to explore, and by the restrictions societies are starting to place on the ever increasing expansion of the scientific and technological establishments. The decision not to produce the Super-Sonic Transport airplane in the U.S., the anticlimatic end

of the lunar program, the campaigns against nuclear energy, the indecisions and difficulties with fusion energy, the resistances and limitations imposed in the U.S. on the recombinant DNA research, all this represents a new trend and challenge to which science in America was not used to. In the preface to the recent issue of *Daedalus* dedicated to the "Limits of scientific enquiry," the present situation is compared with twenty years before, when such a concept, "so meaningful in the context of today's world, would seem inappropriate, even incongruous, to a society overwhelmingly preoccupied with the problems created by the orbiting object called Sputnik". (*Daedalus*, 1978, 108).

This was, of course, the situation as perceived from the U.S., where the reaction to the Sputnik brought additional stimulus to the expanding economic, scientific and military leadership the country enjoyed for many years since World War II or, in a less evident way, since the turn of the century. In the U.S., the space program meant more money for research, more places at the universities, more contracts for industry, and a hope for all the "fall-out", or secondary benefits that the space race could bring to society. In poorer parts of the world, it was much more self-evident that this was a technological program that not only would not help much to further the redeeming promises

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of modern science, but was not even able to capture the world's population imaginations by their achievements. In the sixties, the frontiers to be conquered had already ceased to be in the outer space, to become much closer to the human society.

In this sense, the Nobel Peace Prize given in 1972 to Norman Borlaug was extremely significant. It crowned the technological success of the "green revolution", the development of high-yield species of wheat, rice and corn that promised to solve the problems of hunger in Asia, Africa and Latin America. Only a few years have passed, however, and the memory of the green revolution seems almost to have faded away. Gunnar Myrdal is quoted already in 1968 as saying that "I'm not blind to the possibility of doing great things with technology. But if you don't change the relationship between land and man, it will benefit mostly the upper classes. It may leave the underclasses worse off than before. Don't believe only in technology". In 1974, he had in many ways been proven correct: "its benefits failed to help many of the people. Those that were bypassed began migrating into the cities in search for jobs, but employment opportunities have not kept pace with the need..." (Edwin, 1974, pp. 33 and 39).

If technology in itself cannot solve the problems of mankind, would the application of the principles of scientific investigation and enquiry to the social life do it? The notion that science, so successful in the conquest of nature, could also conquer man's culture and social organizations, was irresistible, and was an essential part of the assumptions that have always surrounded western science.

Closer examination showed that there were two basically contradictory ways in which these assumptions were held. The first was part of the mainstream of economic and political liberalism. It favored freedom of thinking and research on an individual basis, and the elimination of the institutional and moral barriers that could limit individual freedom. Scientific rationality of the individual was supposed to add up into a rational and efficient society, in the same way that economic rationality of individuals was supposed to add up to a rich and prosperous economy. Economics was, in this context, the social science of choice. It provided an analytical model for the understanding of individual rationality, and a rationale for the economic, social, and political values of liberalism.

The alternative view was best represented by Comte's positivism. In a sense, it was the result of the disenchantment with the promises of liberalism and the benefits of individual rationality. Its aim was to produce a blueprint for the organization of society, and make the individuals comply

with it; in the social realm, sociology was the preferred discipline. In its Durkheimian version, social facts were things that existed on their own; individuals were compelled by them in their behavior; and had only the illusions of independence and autonomy. Positivists, however, were evolutionists; for them, society had still to be brought to higher levels of rationality. This was to be obtained through the discovery of the laws, mechanisms, and technical procedures that would uncover a future that was supposedly preordained by the evolutionary process. Freedom was the knowledge of necessity. In this special sense, positivistic evolutionism incorporated history.

The Legitimacy of Politics

It is curious to see how each of these extreme perspectives, in their own way, denied legitimacy to politics. Liberal economics was geared to the explanation of economic structures through the rational behavior of individuals in the market place. Everything that hindered this process was considered essentially irrational, obtrusive, and inefficient. These non-rational elements were later considered as given external institutional and cultural variables that limited the scope of economic behavior, but could not be submitted to economic analysis as such. More recently, a tendency emerged to extend the logic of individual rationality to other areas of social behavior, including the political system, the scientific community, the educational institutions, and decisions about marriage and child-bearing. In all these areas, individuals were supposed "to vote with their feet": to buy or not a given product, to make or not a given investment, to accept or not a job, to have or not have a baby, to vote or not for a candidate, to belong or not to a political party, to choose one or another field of scientific enquiry. Albert Hirschman has called this a mechanism of "exit," that excludes other forms of participation and social behavior, based on feelings and commitments of loyalty, belongingness, solidarity, collective action. These—which he calls "voice"—are essentially political forms of social participation that the strict economics perspective tend to eliminate or explain away (Hirschman, 1970).

In the positivistic perspective, politics is present, but as a conflict between light and darkness, science and ignorance. On one side there is science, knowledge; on the other, there is only ignorance and backwardness. Political life is not perceived, therefore, as a continuous interplay of different groups that have their own legitimate values, preferences, and rights. There is no place for commonly accepted "rules of the game," since there is no game to be played with fairness, but a war to be won by all means.

How did Marxism, in its attempt to bring together English economics and French social thinking, deal with politics? Essentially, Marxism accepted the logic of individual rationality, but tried to place it in a historical and evolutionist perspective. Capitalism was considered the height of rationality, but had in itself the germs for its substitution to a still higher order of social organization. The basic thesis is well known: individual, private economic behavior and appropriation of the means of production was in a collision course with the growing process of socialization of the productive forces. The logic of capitalism was not a simple result of a multiplicity of individual actions, but had a dynamics of its own, that dragged the individuals in its path. The basic contradiction of capitalist society tended to be translated into class conflict for the control of the means of production. Politics, in this context, was essentially a transition from individual to collective action.

In this way, Marxism tried to answer the question left open by positivism or "utopian socialism," which was about who should lead the transformations that would bring the better society. The answer was that the working class would, acting as a collective body in behalf of the interests of each of its members. In this sense, the contradiction between individual and collective rationality could be solved, at least conceptually. Each person and social group had an "objective" interest that was independent from his will, but at the same time placed him in a given position in the class struggle, where his will was to be exerted in the right direction. This was not, or course, a struggle of equals: only one side was destined to win, and it had science at its disposal; the other had only ideology. In this sense, politics could only be accepted as tactics; more basically, only the class struggle mattered, and it was "objective," "scientific," and pre-determined.

Politics and Science

An important clue for the understanding of the legitimization mechanisms of modern political domination is to look to the way this proposed substitution of politics for science actually operates. We know, after Michael Polanyi, that the world of science is commanded by an uncompromising search of truth as well as by well



established mechanisms of authority and inter-personal trust. (Polanyi, 1968). A scientific finding to be accepted, showed Polanyi, not only has to be proved right, but also has to be "plausible" to make sense for the specialists in the area, and to be accepted by those with enough scientific authority. Science is, therefore, naturally conservative and resistant to drastic changes and challenges. At the same time, of course, there are several mechanisms that tend to keep it, more often than not, free from sclerosis: the values of proof and evidence that can be restricted only so much by social limitations; the mechanisms of intellectual competition and free circulation of ideas and information; and the rituals of passage into the scientific community that are often difficult to pass but that are important in making science a Republic of Equals. The scientification of political life incorporates some of these characteristics, but not others. Essentially, there is an emphasis in the mechanisms of authority and interpersonal trust, and also on the educational process that should enable each person to distinguish between what is "scientific" and what is not. But, at the same time, the rituals of passage are kept secret or severely constrained. A strong stratification is, therefore, established between those that have passed the rituals, and acquired the rights to produce knowledge, and those that have not obtained it and can only believe in the technical competence of those on the top. Technocratic authority, in this sense, is closer to the Weberian notion of charismatic than to that of rational authority.

In simpler terms: in a system of technocratic domination, a few command, and the others comply. Those that command make use of the external signs that qualify them for their task; they use the proper jargon, the technical paraphernalia, speak with the proper accent and exhibit the appropriate credentials for their claims. Those that comply cannot understand or judge what is being done, but have learned the significance of the external signs, and trust.

It would be naive to believe, however, that technocracy is nothing but an ideological construct, that would fall when its operating principles are uncovered. In fact, there are strong reasons, reaching the very center of modern societies, that account for its continuing existence.

In very general terms, modern societies have witnessed a double and contradictory process of social modernization that can be accounted for in terms of the classic dichotomy between *gemeinschaft* and *gesellschaft*, community society. The sociological tradition assumed that modernization could be equated with the transition from the first to the second, from small communities to large societies, from homogeneity to diversity. Increasingly large productive organizations, large urban concentrations,

complex systems of division of labor, social stratification systems based on a plurality of institutional and status affiliations—the professions, the neighborhood, the educational background, the family religion, the linguistic origin—all these processes seemed to confirm this assumption. However, what was not fully appreciated was that some of the characteristics of the old communities were also being expanded, and recreated in a larger scale than ever before.

Mass Society

The growth of *gemeinschaft* in modern societies has come to the attention of the social scientists under the terms "mass society," a tradition of study that is at least as old as de Tocqueville. More recently, the notion of a "global village" created by the expansion of the modern systems of mass communications made of McLuhan a prophet of the modern times. Essentially, what characterizes the new *gemeinschaft* is a growing standardization of habits, behavior patterns, value systems, and so on, that follow from the modern system of mass production, mass communications, and mass markets. What is paradoxical here is that these mass systems, to exist and operate, require extremely complex structures of production, administration, accounting, marketing—in other words, very complex *gesellschaft*. It is as if the citizens of modern societies were related to each other in two simultaneous and opposite ways. As producers and salary earners, they hold jobs that often require sophisticated training and participation in extremely complex and differentiated structures. As consumers, they are brought to a world of make-believe that solves the complexity of society into very familiar terms: the same products to buy, the same soap operas to watch on TV, the same clubs to root for, the same department stores from which to buy, the same Holiday Inn hotels to stay in, the same God and flag to worship. As in Kubrick's *2001*, everything is familiar at the journey's end.

In rich countries, the process of increasing massification is limited by several mechanisms. First of all, by the contradiction between the structures of production and the structures of consumption in which the individuals participate. Then, by a diversity of alternative patterns of consumption, innovation, leisure organizations and institutions and voluntary organizations that can be created and adopted by the very abundance of resources. This is much more difficult, however, in poorer countries. There, the transition from traditional to modern *gemeinschaft* is much more violent and is particularly accentuated by the role played by modern technology.

In fact, modern technology tends to stress labor-saving pro-

cesses, that typically affect much more people by its products than what it requires for its management. The adoption of labor-saving technologies has an obvious appeal in economic systems where labor is expensive and scarce, but does not seem to make much sense in societies characterized by cheap and abundant labor forces. However, there are several reasons why these societies tend to look for labor-saving technologies with so much interest. The first is that they have a chronic deficit of products—health services, food, transportation, energy, education—and large-scale, intensive technology systems seem to be a good way of getting these products fast. Second, they have a chronic deficit of semi-skilled manpower, but often a relative abundance of well trained cadres. These well trained cadres prefer and tend to press for high technology systems, which are congenial to their education and skills, and do not require the incorporation of large, semi-specialized working forces in the productive system. Third, there is a process of "technology transfer" from the developed to the developing countries that tend to bring the organizational and technological patterns of the central countries to the peripheral ones.

Dual Societies

The consequence is that the number of people who are involved in the productive sectors of these societies tend to be much smaller than the number of potential consumers or recipients of these products. In a market situation, those that do not produce do not earn money, and therefore cannot consume. Left unattended, this situation generates what has been called "dual" societies, in which one small sector develops into a modern market economy and the larger part remains outside, as a reservoir of unskilled labor. This is not a situation without problems: duality can lead to extremely dangerous political situations, and means also a market restriction for the goods and services produced by the modern sector of society. Thus, there is a growing pressure to provide "services" from one sector to the other: through education, the expansion of the health system, of agencies of urban planning, housing, sanitary and nutritional campaigns and so on. Regardless of the actual benefits of these services, they create a new market for the professionals trained at the country's universities, for



the adoption of new techniques of mass communication and education, for the organization of huge medical establishments and an ever growing bureaucracy, which actually expands the size and the resources available for the so-called modern sector of society.

In short, while in rich societies there is a contradiction between the citizens *qua* consumers and the citizens *qua* producers, in poor countries a sizable part of the population can only aspire to the status of passive consumers in a massified and benevolent society.

The political system is a meeting ground for these two forms of social processes. On one hand, this is the place of *gesellschaft*, where the different social interests coalesce, bargain and decide for the allocation of society's scarce resources. On the other, however, the democratic political process is based on mass voting in election days, and this is fertile ground for mass behavior, for the applications of the logic of primary and inter-race behavior, manipulated by the media, in the decisions. Do the voters know how to vote? As far as their behavior is dictated by *gesellschaft*, they supposedly do; as far as *gemeinschaft* prevails, obviously they don't. Democratic societies depend on a precarious balance between the two. This balance is particularly difficult in countries where dualism excludes the majority from the effective experience of participation in complex productive organizations.

The technocrat's answer to this problem tends to be two fold. On one hand, they say that the ability to vote is a question of education and intellectual maturity, which cannot be expected in populations where minimal standards of formal education are not met. In this sense, they express a faith in the future rationalization of society which has no relation with the actual experience of the modern societies of today, as we have seen above. On the other hand, they "realistically" consider politics as a realm or irrational and emotional behavior, to be dealt with the instruments of public opinion control and propaganda. Politics is not considered a question of interest articulation, but of social psychology, to be dealt with accordingly.

Answer of Socialistic Countries

Are the socialist countries an example of an effective alternative to both the democratic and the technocratic political models? There is little doubt that the socialist countries have been very effective in attending to the basic needs of their populations—health, educations, food—much more so than capitalist countries of similar levels of economic development. China, more particularly, was often cited as an example of the renunciation of the technocratic mode of social organization, to the be-

nefit of "alternative" or "intermediate" technologies that are much more accessible to everybody. Backyard furnaces, barefoot doctors, acupuncture, the elimination of the distinctions between manual and intellectual labor, all these items seemed to confirm a radical departure of the Western postulates of modernization through increasingly complex and sophisticated technologies.

Without trying to assess the real achievements in each of these points—there is often too much wishful thinking and too little information in the West about everything concerning China—it seems to me that the explanation for the Chinese achievements are not related with the adoption of less sophisticated and decentralized technologies, but, rather with the adoption of a very complex and large-scale technology of social organization and production. What the socialist countries have and the capitalist countries lack are these huge networks of social organization that tie up the whole society from each shop and residential area. The social experience for this seems to be alien to the Western tradition of individualism, but quite congenial with the Asian tradition of large-scale bureaucratic-patrimonial empires and complex familialistic and localistic structures of social interrelations.

What is the basis for this type of social organization? According to the standard Marxist view, this would be the natural crowning of the maturation of capitalist societies and the socialization of the means of production. We, however, are dealing here with underdeveloped countries. Karl Wittfogel, in his *Oriental Despotism*, tried to explain the complex system of social organization of Asian societies by the productive needs of irrigation for agriculture (Wittfogel, 1957). The militarization of societies based on predatory warfare can also be mentioned as an explanation. The experience of contemporary socialism, however, shows that there is a strong element of social voluntarism in the establishment of these societies—with Lenin and the Bolshevik party in the Soviet Union, or with Mao and his army in China. The choice of technologies for economic production and welfare, rather than the cause, seems to be nothing but an option that is in large measure determined by the needs and constraints that are inherent in these large-scale systems of social mobilization and control.

In short, what the socialist countries seem to have achieved is an effective system of incorporation of large masses of population into the modern societies through some kind of social engineering that bypasses the strictly technological requirements of manpower of the modern productive organizations. In these societies, politics is considered *passé*, but, as usual, is only suppressed. The cohesion of the extensive fabric of social

integration and participation is maintained by a complex and extensive system of ideological indoctrination, political training and person-to-person social control. Dissent is only tolerated within narrow and unstable limits, and informal and formal coercion is always a possibility. Technocracy in the sense of the political dominance of scientists and engineers is not very salient—but the technocratic domination of those that control the systems of social organization (the state, the party, the unions), is pervasive.

If what was said so far is correct, some conclusions seem to follow, about the relations between science, education, technocracy and democracy. The first conclusions, or propositions, are negative: science and technology by themselves cannot eliminate scarcity from society, and cannot, therefore, eliminate politics. There are some straightforward reasons for that, which have to do with the economic and social structures that place limits and constraints to the positive and negative uses of scientific knowledge. If it is illusory to believe that science and technology, by their growth, can redeem society, it is also illusory to believe that a reversal to small scale, "soft" humanized technology could produce the same result (Schumacher, 1973; Lovins, 1977). There are, however, some deeper and more philosophical reasons as well. Scarcity is not a simple matter of absolute needs, but also of relative, or "positional" values, that are by definition scarce; and politics is, when properly understood, an essentially human activity, or as Hannah Arendt thought, a basic characteristic of human condition.

The same negative conclusions can be applied to the incursions of positivistic science in the realm of social life. The discussions about the epistemological possibilities of empirical social sciences often misses the most important point. What is at stake is not whether a positive science of society is possible (which of course it is) but what this science can do to society. Political behavior can certainly be studied empirically and handled through techniques of social engineering, if the manager has enough power for that; only in Skinner's *Walden*, however, would this mean the effective elimination of politics, and of human society as we understand it.



The Power of Science in Society

The power of science in society is much more limited than many scientists would like it to be; the power of social scientists is still smaller, mostly when compared with their still larger aspirations. One thing that social scientists can do, however, is to try to eliminate the technocratic myths of scientific imperialism we inherited from the nineteenth century. This would make of politics a more dignified activity, would legitimize diversity and plurality, and would eliminate one of the most important ideological justifications for technocratic rule. As a byproduct, it could even provide for better science.

What would that do for democracy? One can have equity without

politics in a Skinnerian utopia, or politics with inequity and injustice in modern, stratified societies; in both cases, the democratic ideals are not being fulfilled. I would contend that there is a limit, shortly above the satisfaction of basic needs, of how much equity one can have in a society without politics. Political life is precious because, even when it is unfair and unequal, it leaves open the doors for potential change and improvement—as it does, of course, for deterioration and increasing inequity. Politics breeds uncertainty and improvisability, and that is why the managerial positivism of nineteenth century scientism and twentieth century technocratism come out so strongly against it. But this is also what

makes political life something worth working for.

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CIENCIA, TECNOLOGIA, TECNOCRACIA Y DEMOCRACIA

SIMON SCHWARTZMAN

RESUMEN La década de los setenta cuestionó, una vez más, las esperanzas de que la ciencia y la tecnología podrían, de por sí mismas, proveer la base para el bienestar futuro de la humanidad. La reducción del programa espacial norteamericano, por un lado, y las limitaciones de la "revolución verde", por el otro, son testigos de ese hecho. El escepticismo acerca de la tecnología conduce a tentativas de aplicar el método científico a la administración de la vida social, de acuerdo con dos enfoques diferentes. El primero consiste en procurar racionalizar la sociedad a través de la creación de un mercado abierto de personas racionales, con la Economía formando su disciplina paradigmática. El segundo es el intento de organizar la sociedad según planes bien establecidos y la Sociología, tal como fue concebida por Auguste Comte, sería la ciencia para realizarlo.

En ambos casos, la política debería ser excluida como elemento no-racional que perturba el libre ejercicio de la racio-

nalidad. El modelo organizacional de la comunidad científica, cuando es aplicado al sistema político, conduce a ideologías tecnocráticas de ingeniería social. El presente texto pretende mostrar, sin embargo, que no existe escapatoria técnica o tecnocrática para los problemas de bienestar social y de libertad. Es ilusorio pensar que la ciencia y la tecnología, por su crecimiento, puedan redimir la sociedad. También es ilusorio pensar que el regreso a tecnologías de pequeña escala pueda tener tal efecto, pues éstas, cuando se les intenta implementar, están normalmente rodeadas por sistemas de gran escala de control e ingeniería social. En conclusión, el artículo defiende la tesis que el papel más importante de las ciencias sociales es el de ayudar a aclarar el verdadero puesto de la ciencia y de la tecnología en los sistemas sociales y políticos modernos, en vez de tratar de cumplir los mitos tecnocráticos que heredamos del siglo XIX.

CIÊNCIA, TECNOLOGIA, TECNOCRACIA E DEMOCRACIA

SIMON SCHWARTZMAN

RESUMO A década de setenta colocou em questão, mais uma vez, as expectativas de que a ciência e a tecnologia poderiam, por elas mesmas, dar a base para o bem estar futuro da humanidade. A redução do programa espacial norte-americano, por um lado, e os limites da "revolução verde", por outro, são seus melhores exemplos. O ceticismo com a tecnologia conduz a tentativas de aplicar o método científico para a administração da vida social, de acordo com duas abordagens diferentes. A primeira consiste em tentar racionalizar a sociedade através da criação de um mercado livre de pessoas racionais, tendo a Economia como sua disciplina paradigmática. A segunda é a tentativa de organizar a sociedade segundo planos bem estabelecidos - e a sociologia, tal como foi concebida por Auguste Comte, seria a ciência social para fazê-lo.

Em ambos casos, a política deveria ser excluída, como elemento não racional que perturba o livre exercício da racionalidade. O modelo organizacional da comunidade científica, quando aplicado ao sistema político, conduz a ideologias tecnocráticas de engenharia social. Este texto pretende mostrar, no entanto, que não existe escapatória técnica ou tecnocrática para os problemas de bem estar social e de liberdade. É ilusório acreditar que a volta a tecnologias de pequena escala possa ter este efeito, porque esta, quando é tentada, vem normalmente cercada por sistemas de grande escala de controle e engenharia social. Em conclusão, o artigo defende a tese de que o papel mais importante das ciências sociais é o de ajudar a esclarecer o verdadeiro lugar da ciência e da tecnologia nos sistemas sociais e políticos modernos, ao invés de tentar cumprir os mitos tecnocráticos que herdamos do século XIX.